

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference P036716WO	FOR FURTHER ACTION <small>see Form PCT/ISA/220 as well as, where applicable, item 5 below.</small>	
International application No. PCT/GB2005/000372	International filing date (day/month/year) 04/02/2005	(Earliest) Priority Date (day/month/year) 06/02/2004
Applicant MEDICAL RESEARCH COUNCIL		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 7 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. ☒ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (See Box II).

3. ☒ **Unity of invention is lacking** (see Box III).

4. With regard to the title,

- ☒ the text is approved as submitted by the applicant.
☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

- ☒ the text is approved as submitted by the applicant.
☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the drawings,

- a. the figure of the **drawings** to be published with the abstract is Figure No. 3A
☒ as suggested by the applicant.
☐ as selected by this Authority, because the applicant failed to suggest a figure.
☐ as selected by this Authority, because this figure better characterizes the invention.
- b. ☐ none of the figures is to be published with the abstract.

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Box No. I Nucleotide and/or amino acid sequence(s) (Continuation of item 1.b of the first sheet)

1. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, the international search was carried out on the basis of:

a. type of material

☒

a sequence listing

☐

table(s) related to the sequence listing

b. format of material

☒

in written format

☒

in computer readable form

c. time of filing/furnishing

☒

contained in the international application as filed

☐

filed together with the international application in computer readable form

☒

furnished subsequently to this Authority for the purpose of search

2. ☒ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

3. Additional comments:

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International Application No
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A. CLASSIFICATION OF SUBJECT MATTER

INV. C12N15/81 C12N15/63 C12N15/75 C12P21/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

C12N C12P

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, BIOSIS, MEDLINE, EMBASE, CHEM ABS Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>KITAZONO ANA A ET AL: "Marker-fusion PCR for one-step mutagenesis of essential genes in yeast"</p> <p>YEAST, vol. 19, no. 2, 30 January 2002 (2002-01-30), pages 141-149, XP002353151 ISSN: 0749-503X *Whole document, in particular: Abstract and figures 1 and 3*</p> <p>----- -/--</p>	<p>1-9, 18-40</p>

☒ Further documents are listed in the continuation of box C.

☐ Patent family members are listed in annex.

° Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *G* document member of the same patent family

Date of the actual completion of the international search

18 November 2005

Date of mailing of the international search report

20.04.2006

Name and mailing address of the ISA

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Authorized officer

BULCAO DE MELO BARRE

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>MURPHY C K ET AL: "A double counter-selection system for the study of null alleles of essential genes in Escherichia coli"</p> <p>GENE, ELSEVIER, AMSTERDAM, NL, vol. 155, no. 1, 1995, pages 1-7, XP004042435</p> <p>ISSN: 0378-1119</p> <p>*Whole document, in particular: Abstract and figure 1*</p>	1-9, 18-40
A	<p>LUCA F C ET AL: "MOB1, an essential yeast gene required for completion of mitosis and maintenance of ploidy"</p> <p>MOLECULAR BIOLOGY OF THE CELL, BETHESDA, MD, US, vol. 9, no. 1, January 1998 (1998-01), pages 29-46, XP002338945</p> <p>ISSN: 1059-1524</p> <p>cited in the application</p> <p>*Whole document, in particular: Abstract and Material and Methods*</p>	1-9, 18-40
A	<p>GEYMONAT MARCO ET AL: "In vitro regulation of budding yeast Bfa1/Bub2 GAP activity by Cdc5."</p> <p>JOURNAL OF BIOLOGICAL CHEMISTRY, vol. 278, no. 17, 25 April 2003 (2003-04-25), pages 14591-14594, XP002353152</p> <p>ISSN: 0021-9258</p> <p>*Whole document, in particular: Abstract and Material and Methods*</p>	1-9, 18-40
A	<p>CROSS FREDERICK R: "'Marker Swap' plasmids: Convenient tools for budding yeast molecular genetics"</p> <p>YEAST, vol. 13, no. 7, 1997, pages 647-653, XP002353153</p> <p>ISSN: 0749-503X</p> <p>*Whole document, in particular: Abstract and Material and Methods*</p>	1-9, 18-40
A	<p>ZHANG REN ET AL: "DEG: A Database of Essential Genes."</p> <p>NUCLEIC ACIDS RESEARCH, vol. 32, no. Database Issue, 1 January 2004 (2004-01-01), pages D271-D272, XP002353154</p> <p>ISSN: 0305-1048</p> <p>cited in the application</p> <p>*Whole document*</p>	1-9, 18-40

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	SIKORSKI R S ET AL: " 20 IN-VITRO MUTAGENESIS AND PLASMID SHUFFLING: FROM CLONED GENE TOMUTANT YEAST" METHODS IN ENZYMOLOGY, ACADEMIC PRESS INC, SAN DIEGO, CA, US, vol. 194, 1991, pages 302-318, XP002912110 ISSN: 0076-6879 cited in the application *Whole document, in particular: figure 1* -----	1-9, 18-40
A	ELLEDGE S J ET AL: "A FAMILY OF VERSATILE CENTROMERIC VECTORS DESIGNED FOR USE IN THE SECTORING-SHUFFLE MUTAGENESIS ASSAY IN SACCHAROMYCES CEREVISIAE" GENE, ELSEVIER, AMSTERDAM, NL, vol. 70, no. 2, 30 October 1988 (1988-10-30), pages 303-312, XP000000376 ISSN: 0378-1119 cited in the application *Whole document, in particular: Abstract and figure 1* -----	1-9, 18-40

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Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-9 (completely) and 18-40 (partially)

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-9 (completely) and 18-40 (partially)

Invention 1 concerns a cell that express both chromosomal genes and extra-chromosomal genes, wherein (a) the expressed extra-chromosomal genes include a gene with an essential function, the expression of which is unconditionally required for survival of the cell, (b) the chromosomal genes do not provide that essential function, and (c) the extra-chromosomal genes include a heterologous gene, the expression of which is controlled by a promoter that is functional in the cell. Invention 1 further concerns a method for preparing said cell, as well as the starting and intermediate cells used in said method.

2. claims: 10-14 (completely) and 18-40 (partially)

Invention 2 concerns a vector comprising (a) an essential gene whose expression is unconditionally required for survival of a cell of interest, (b) a conditionally-required gene to allow selection of host cells which include the vector, and (c) a gene encoding a heterologous protein of interest operably linked to a promoter that is functional in the cell of interest. Invention 2 further concerns a method for preparing a cell by transforming it with said vector.

3. claims: 15-17 (completely) and 18-40 (partially)

Invention 3 concerns a vector comprising (a) an essential gene whose expression is unconditionally required for survival of a cell of interest, (b) a conditionally-lethal gene to allow selective killing of host cells which include the vector, wherein the essential gene is MOB1, Cdc33 or Hsp10. Invention 3 further concerns a method for preparing a cell by transforming it with said vector.
